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ACQUISITION RESEARCH PROGRAM SPONSORED REPORT SERIES

Analysis of Contract Source Selection Strategy

7 July 2015

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ANALYSIS OF CONTRACT SOURCE SELECTION STRATEGY

ABSTRACT

The Department of Defense (DOD) spends billions acquiring weapons systems, supplies, and services. The contract management process has to be executed diligently to ensure the government is receiving the highest return on investment. The process has six steps, two of which relate to the source selection strategy: solicitation planning and source selection. Once the acquisition team determines whether to use a lowest price technically acceptable (LPTA) or Tradeoff source selection strategy, they evaluate proposals to determine which offer presents the best value to the government.

The purpose of this research is to explore potential relationships between the source selection strategy (LPTA or Tradeoff) and resultant contract outcomes. This research uses data collected from contract files and related documentation from two major systems commands (Naval Air Systems Command and Naval Sea Systems Command) to show the implication of the LPTA and Tradeoff source selection strategies. The findings suggest that an LPTA source selection strategy has a significantly shorter lead-time to contract award. The findings should be viewed with caution, however, as the sample size consisted of only six LPTA contracts. This report concludes with two recommendations to improve further research on choosing a source selection strategy and contract outcomes.

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LIST OF ACRONYMS AND ABBREVIATIONS

ASN	Assistant Secretary of the Navy
COP	Communities of Practice
CICA	Competition in Contracting Act
COTR	Contracting Officer's Technical Representatives
CPAF	Cost-Plus Award Fee
CPARS	Contractor Performance Assessment Reporting Systems
CPFF	Cost-Plus Fixed Fee
CPIF	Cost-Plus Incentive Fee
DASN	Deputy Assistant Secretaries of The Navy
DAU	Defense Acquisition University
DFARS	Defense Federal Acquisition Regulation Supplement
DOD	Department of Defense
DODIG	Department of Defense Inspector General
DRPM	Direct Reporting Program Managers
EVM	Earned Value Management
FAR	Federal Acquisition Regulation
FASA	Federal Acquisition Streamlining Act
FFP	Firm Fixed Priced
FPIF	Fixed-Plus Incentive Firm
FTO	Full Tradeoff
GAO	Government Accountability Office
GPE	Government-Wide Point of Entry
IFB	Invitation for Bid
IMF	Intermediate Maintenance Facility
LPTA	Lowest Price Technically Acceptable
NAVAIR	Naval Air Systems Command
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
NDAA	National Defense Authorization Act

NDI	Non-developmental Items
NMCARS	Navy/Marine Corps Acquisition Regulation Supplement
NSWC	Naval Surface Warfare Center
NUWC	Naval Undersea Warfare Center
PALT	Procurement Administrative Lead Time
PEO	Program Executive Officers
PPIRS	Past Performance Information Retrieval System
PSA	Principal Staff Assistant
QAE	Quality Assurance Evaluators
RDA	Research, Development and Acquisition
RDT&E	Research, Development, Test, and Evaluation
RFI	Request for Quotation
RFP	Request for Proposal
RFQ	Request for Information
SAE	Service Acquisition Executive
SBA	Small Business Act
SOW	Statement of Work
SYSCOM	Systems Commands
T4C	Termination for Convenience
T4D	Termination for Default
TINA	Truth in Negotiation Act
USD (AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistic

ACKNOWLEDGMENTS

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I. INTRODUCTION

With an annual budget approaching $600 billion, the Department of the Defense's (DOD) spending power is greater than the gross domestic product of many nations. The Government Accountability Office reported that the DOD spent approximately $310 billion acquiring major weapons systems, supplies, and services in fiscal year 2013 (GAO, 2014). Government acquisition professionals use the contract management process as a road map to navigate the defense acquisition life cycle (Rendon & Snider, 2008, 165). The contract management process consists of pre-award, award and post-award phases. The pre-award phase includes procurement planning and solicitation planning; the award phase consists of the source selection, in which the contract is awarded; and, finally, the post-award phase consists of contract administration and contract closeout.

A critical step in any acquisition program is choosing a contracting award strategy that will yield the highest benefit to the government. The two primary source selection strategies used by government acquisition professionals to determine the proposal that represents the best value to the government are lowest price technically acceptable (LPTA) and Tradeoff (also known as full Tradeoff [FTO]). While there are several strategies that can be used, the basic premise underlying all of these strategies is the relative importance of cost/price and non-cost/non-price factors (e.g., factors related to the technical capabilities, managerial capabilities, past performance, etc., of a proposal.) The Federal Acquisition Regulation (FAR) states that LPTA is "appropriate for use when best value is expected to result from selection of the technically acceptable proposal with the lowest evaluated price." In this case, cost/price is the most important factor. Tradeoff, on the other hand, must be used when best value can be obtained by choosing the "other than the lowest priced offeror or other than the highest technically rated offeror" (FAR, 2014, Part 15.101-1). In this case, cost/price may be less important than other non-cost/non-price factors, and cost/price can be "traded off" for factors deemed more important for contract success.

A.   PURPOSE

The purpose of this research is to determine potential relationships between the source selection strategy (LPTA or Tradeoff) and resultant contract outcomes. The researchers seek to determine if relationships exist between the source selection strategy and various contract outcomes, such as procurement administrative lead time (PALT), cost and schedule overrun or underruns, contractor performance ratings, and other factors. The results of this analysis will be used to inform the DOD contracting community and their customers of the potential costs and benefits associated with choosing a particular source selection strategy. We hope to provide guidance that will help acquisition professionals choose the source selection strategy that is most appropriate for their requirement.

B.   RESEARCH QUESTIONS

This research intends to answer the following questions:

1.   How does the source selection strategy affect pre-award metrics (e.g., PALT, number of solicitation amendments, number of protests)?

2.   How does the source selection strategy affect post-award outcomes (e.g., Contractor Performance Assessment Reporting Systems [CPARS] ratings, Earned Value Management [EVM] performance metrics)?

3.   Does one source selection strategy consistently fare better than the other in terms of both pre-award metrics and post-award outcomes?

4.   Does the contract outcomes (e.g., past performance data) justify the government paying a premium to award to other than the lowest bidder?

C.   METHODOLOGY

The research methodology consists of a literature review, data collection, data analysis, and determination of the findings. We analyzed the source selection process to include the best value continuum and the associated source selection strategies (LPTA or Tradeoff) used to obtain the best value. We reviewed completed contracts and contract-related documentation from Naval Air System Command (NAVAIR) and Naval Sea

System Command (NAVSEA). The team also collected data from completed contract files, paying particular attention to the source selection plans and solicitations to determine which contracts were awarded based on an LPTA strategy and which were awarded based on a Tradeoff strategy. In the cases for which Tradeoff was chosen, the research team examined the award criteria to identify which criteria were most important in the source selection strategy. Commonly used evaluation criteria include, but are not limited to, technical, management, past performance, and cost. The data obtained from the contract files is used to determine potential relationships between the source selection strategy (LPTA or Tradeoff) and resultant contract outcomes. The data was analyzed using analysis of covariance (ANCOVA) procedures, which is used to determine if significant differences in contract outcomes exist between the two award strategies.

D.   BENEFITS OF THE RESEARCH

The purpose of this research is to determine potential relationships between the source selection strategy (LPTA or Tradeoff) and resultant contract outcomes. The benefits of this research will be to assist federal contracting agencies in planning there procurements and knowing the implications of a LPTA or Tradeoff source selection strategy in terms of the potential contract outcomes. If a pattern of contract outcomes is identified, this research could help naval, DOD, and federal acquisition professionals choose the strategy with the best chance of producing positive contracting outcomes, thus potentially saving time and money without reducing performance quality. For cases in which the Tradeoff process is used, this research may help assesses whether or not the contract outcomes justified paying a premium cost/price.

E.   LIMITATIONS OF THE RESEARCH

The primary limitation of the research is the size of the statistical sample. Due to time constraints and the size of the research team, only 36 contracts were reviewed. The time allotted to review contract files proved to be significantly shorter than what was needed to gather a larger sample size. Larger, more complex procurements naturally took longer to review and locate pertinent data. Another major challenge the team encountered

while collecting data was the lack of commonality in the contract files. Though each command required contracting professionals to utilize a contract file checklist, the team noticed a variety of interpretations and utilizations of the checklist. Some contract files were extremely organized and revealed that the contracting professional strictly adhered to the checklist, while others seemed to include only what the contracting professional deemed to be critical items. Consequently, the team spent a significant amount of time trying to locate the pertinent data, which resulted in a smaller sample size than anticipated. We still feel the data is worthy of analysis, however our conclusions should be interpreted with caution given the small sample size.

F.   ORGANIZATION OF THE REPORT

This report is organized into five chapters, including this introduction. The next chapter, Chapter II, includes a review of the literature related to the contract management process, and source selection strategies. Chapter III provides an overview of NAVAIR and NAVSEA and their contract management strategies. Chapter IV presents the results and findings of the data collected and answer the research questions. Finally, Chapter V provides the summary, conclusion, and recommendations for further research.

G.   SUMMARY

This chapter provided a background of the research contained herein, including the purpose of the research, the research questions, methodology, benefits, and limitation of the research. The next chapter reviews the literature review associated with the contract management process and source selection strategies.

II. LITERATURE REVIEW

The purpose of this chapter is to provide an overview to the federal government contract management process. This literature review familiarizes the reader with the three phases and six steps of the contract management process, highlighting how each step affects the determination of the source selection strategy. This chapter reviews when each source selection strategy (LPTA or Tradeoff) is appropriate according the Federal Acquisition Regulation (FAR) and other guidance. This chapter includes reports from investigative agencies that show the best value practices used by various government contracting agencies and the factors the federal government considers when choosing a source selection strategy.

A. CONTRACT MANAGEMENT STATUTES AND REGULATIONS

To understand the contract management process, one must first know the meaning of the word contract. The FAR (2014) defines a contract as

> a mutually binding legal relationship obligating the seller to furnish the supplies or services (including construction) and the buyer to pay for them. It includes all types of commitments that obligate the Government to an expenditure of appropriated funds and that, except as otherwise authorized, are in writing. In addition to bilateral instruments, contracts include (but are not limited to) awards and notices of awards; job orders or task letters issued under basic ordering agreements; letter contracts; orders, such as purchase orders, under which the contract becomes effective by written acceptance or performance; and bilateral contract modifications. Contracts do not include grants and cooperative agreements covered by 31 U.S.C.6301, et seq. (FAR, 2014, Part 2.101b)

A slightly more understandable definition of a contract is a written document that confirms and communicates the agreement between buyer and seller, but first and foremost it helps develop and maintain professional business partnerships between the two (Garrett, 2010).

There are several statutes and regulations that dictate how government contacts are managed. The statutes include the Small Business Act (SBA) of 1953, the Truth in Negotiation Act of 1962 (TINA), the Competition in Contracting Act of 1984, the

Federal Acquisition Streamlining Act of 1994 (FASA), and the Federal Acquisition Reform Act of 1996 (FARA). The primary regulatory guidance for federal government contracting is the Federal Acquisition Regulation (FAR).

(1)   The Small Business Act of 1953

The Small Business Act (SBA) requires contracting officers to ensure that small business concerns and small disadvantaged business concerns obtain their fair share of government contract awards (Nash, Schooner, Obrien-DeBakey, & Edwards, 2007). To be considered a small business, a company must be "organized for profit," "have a place of business in the United States," "operate primarily within or make a significant contribution to the United States economy," and be "independently owned and operated" (FAR, 2014, Part 19.001). A small business must not be "dominant in its field on a national basis" (SBA, 2015).

(2)   The Truth in Negotiation Act of 1962

TINA requires contracting officers to purchase supplies and services from responsible sources at fair and reasonable prices (FAR, 2014, Part 15.403). TINA requires offerors to submit certified cost or pricing data if a procurement exceeds the $700,000 TINA threshold (FAR, 2014, PART 15.403). Under TINA, the contracting officer obtains accurate, complete, and current data from offerors to establish a fair and reasonable price (DFAR, 2014, Part 215.403). Per Title 41 U.S.C. Chapter 35, TINA allows the government to hold contractors financially and possibly criminally liable if it is later found that a contractor "did not provide accurate, complete, and current cost or pricing data" (Truth in Negotiations Act, 1962),

(3)   The Competition in Contracting Act of 1984

CICA requires contracting officers to utilize full and open competition as the standard. CICA provides certain exceptions that contracting officers may use instead of full and open competition (e.g., SBA 8(a) small or disadvantaged businesses, HUBZone, veteran owned businesses, only one responsible source (FAR, 2014, Part 6302-1), unusual and compelling urgency (FAR, 2014, Part 6302-2). Unless the contracting officer

can justify an exception to CICA, full and open competition must be used in the solicitation and awarding of federal government contracts.

(4) The Federal Acquisition Streamlining Act of 1994 and the Federal Acquisition Reform Act of 1996

FASA and FARA are both designed to make government contracting more like the commercial sector, simplifying the procurement process and saving money. The FASA dictates a preference for the use of commercial items to fill the government's requirements and simplifies the process to acquire them through the commercial market. When possible, acquisitions should move to a price-based, market-driven environment. Source selection must be made on a "best value" not "cheapest price" basis (Office of the Under Secretary of Defense (AT&L), 2011). The FARA, later called the Clinger-Cohen Act, continues with FASA's preference for commercial procurement by eliminating the requirement for cost and pricing data as well as expanding the definition of commercial item to include the following:

- Items that have evolved from commercial items
- Items that are commercial with modifications to meet government-unique requirements
- Combinations of commercial items and services for government use
- Non-developmental items (NDI), or items originally developed and/or sourced by a government agency
- Services at catalog or market price
  (E. Yoder, personal communication, 2014)

These reforms expand the definition of commercial items to encompass not only goods, but also virtually all types of services (Nash et al., 2007).

(5) Federal Acquisition Regulation

The primary regulation used by all federal government agencies in the "acquisition of supplies and services with appropriated funds" (FAR, 2014) is the FAR. It became effective on April 1, 1984, and is "prepared, issued, and maintained" within applicable laws under the joint authorities of the Secretary of Defense, the Administrator of General Services, and the Administrator, National Aeronautics and Space Administration (FAR, 2014, Part 1.103b). Government agencies also have supplements to

the FAR with specific modifications that meet their own requirements. For example, the Navy/Marine Corps Acquisition Regulation Supplement (NMCARS) adds language to the FAR specifically for Navy and Marine Corps acquisitions. The following example shows where the NMCARS and the FAR differ.

> (a)(1) Cost or price evaluation. **Methods of evaluation which assign a point score to cost or price and combine it with point scores for other evaluation factors generally should not be used** [emphasis added]. Point scores can be helpful in summarizing subjective evaluation of technical and other factors, but are not needed in evaluating cost or price and tend to obscure the Tradeoff between cost/price and other factors, rather than clarifying it. If point scoring of cost/price is utilized, it should be demonstrated that the value of a cost/price point is comparable, in value to the Government, to the value of a non-cost/price point. When a cost realism analysis is performed, the resulting realistic cost estimate should be used in the evaluation of cost, except when using a firm-fixed-price or fixed-price with economic price adjustment type of contract. (NMCARS, 2014, 5215.305)

In the boldfaced text, the NMCARS specifically states that the use of a point scale should not be used as an evaluation factor for cost or price, even if used for other aspects of the Tradeoff process. The rest of the section refers to the higher FAR guidance. As previously discussed statutes and regulations dictate how government contacts are managed, the next section will discuss in more detail the contract management process.

B.   CONTRACT MANAGEMENT PROCESS

The previous section discussed statutes and regulations governing the contract management process. The next section will discuss in more detail the contract management process by looking at the three phases and six steps. Contracts are looked at from two very different perspectives. On one side is the seller (defense contractors, in this case), who provides goods (weapons systems or parts) or services in return for payment. The other is the buyer (government), who purchases goods and services through the use of contracts. A definition for contract management is "the art and science of managing a contractual agreement throughout the contracting process" (Garrett, 2010, p. 18). The DOD typically does not produce any of the items or services it requires to sustain itself through daily and future operations, so it must outsource, or rely on contractors, to fulfill

its requirements. Contracts, as stated previously, are legally binding documents that require the seller to provide the item or service and the buyer to pay for it, in so reducing uncertainty and risk involved in transactions. Contracts are the main way to ensure both the government and contractor understand exactly what the agreement entails, as it is all in writing. Understanding and adhering to the contract can help develop and maintain a professional and ethical relationship by both the government and the contractor. Based on Garrett (2010), there are three phases to the contract management process, and within those phases there are six steps for the buyer (government) and the seller (contractor). Figure 1 shows the flow of the six steps through the contract management process. For the purpose of this research, the focus is only on the steps of the buyer.
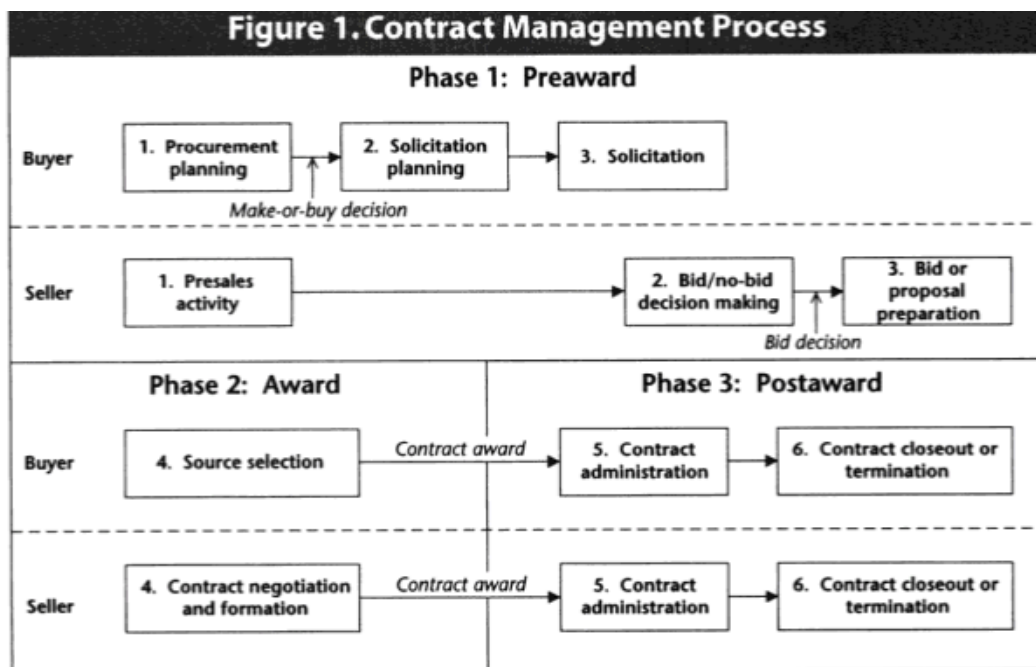
Figure 1.   Contract Management Process (from Garrett, 2010, p. 20)

1. Pre-award Phase

In accordance with the FAR (FAR, 2014, Part 7.102) "all agencies will perform acquisition planning and conduct market research on requirements determined to have legitimate needs." The results of that market research will be used to make decisions on whether or not the requirement will be sent to prospective contractors as a request for

proposal/quotation/information (RFP/RFQ/RFI), what factors will be used to determine best value to the government, and how the solicitation will be structured.

(1)   Step 1: Procurement Planning

The procurement planning step is "the process of identifying which business needs can be best met by procuring products or services outside the organization. This process involves determining whether to procure, what to procure, how to procure, and when to procure" (Garrett, 2010, 81). As this is the initial step and stage, it is where you are planning the various aspects of the procurement (e.g., source selection strategy, contract type, contract structure, etc.) that will be used throughout the entire contract management process. The initial analysis of the requirement, or whether to "build or buy," is done during this stage to determine what exactly is needed, be it a service or weapon system. Once the determination is concluded, market research must be conducted to find the most suitable approach to acquiring the requirement. Market research may be done though pre-solicitation conferences or other means. Risk analysis is conducted to determine the ability of industry to handle the requirement, the cost effectiveness of going forward with the proposal, and the best source selection strategy to use. A procurement management plan is created that describes the procurement process throughout the management of the contract. The development of an Invitation for Bid (IFB) or Request for Proposal (RFP) will then be drafted, as will preliminary documents to be used in the solicitation planning step.

(2)   Step 2: Solicitation Planning

The solicitation planning step is "the process of preparing the documents needed to support the solicitation" (Garrett, 2010, p. 88). Prior to beginning this step, the procurement management plan will be reviewed. The statement of work (SOW) will be developed to explain in clear, concise language the work the contractor must accomplish.[1] The SOW may be considered the most critical document in the acquisition process (Rumbaugh, 2010). Individuals from both the government and industry read the

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[1] Statement of objectives (SOO), work breakdown structures (WBS), and performance work statement (PWS) may be used as well or in place of SOW depending on contract type

SOW; therefore, if it does not reflect exactly the requirements as intended, severe issues in the contract administration process may occur. The SOW sets the bounds of the government's requirements, enabling the contractor to accomplish them. The SOW reflects the results of market research, and impacts all other steps of the contracting process. During this step, proposal evaluation factors are developed to communicate program priorities in general order of importance. Some examples of proposal evaluation factors include: technical performance, past performance, cost, supportability, producibility, and management approach. The requirements of the SOW will be related to the source selection strategy, whether it is LPTA or Tradeoff. The solicitation planning step output is the solicitation, which is in the form of an RFP or IFB. If the source selection strategy selected is anything other than LPTA, then the solicitation must be in the form of an RFP, as IFBs do not allow for anything other than LPTA and also do not allow for any type of communication with the bidders during the source selection process (FAR, 2014, Part 14.101). The solicitation will include the SOW and any other clarifying documentation such as instructions to offerors regarding how to complete and submit their proposal. When considering source selection strategy, Section M of the solicitation is the key section that dictates how the proposals will be evaluated and what the evaluation criteria will be, whether an LPTA or Tradeoff approach will be used (FAR, 2014, Part 15.304e). Section M identifies all significant evaluation factors that will be considered in evaluating proposals and their relative importance. When evaluation factors other than cost/price are used, the solicitation must state if the evaluation factors are significantly more, approximately equal, or significantly less important than cost/price. A solicitation can have Tradeoff factors that are more advantageous to the federal government and still award to the offeror with the lowest bid submitted. With all of the information derived from the solicitation planning step, procurement documents can be developed.

(3)   Step 3: Solicitation

The solicitation process "consists of obtaining information (bids and proposals) from prospective sellers on how project needs can be met" (Garrett, 2010, p. 90). In the previous step, bidders would have been identified, and a qualified bidders list would be

generated. It is important to ensure that all bidders have a clear understanding of what the government is requesting in the RFP. In many solicitations, the government will advertise through the government-wide point of entry (GPE), "the single point where government business opportunities" which exceed $25,000, including synopses of proposed contract actions, solicitations, and associated information, can be accessed electronically by the public" (FAR, 2014, Part 2.101). The GPE is located at www.fedbizops.gov. The resulting formal bids should be submitted by responsible sources (FAR, 2014, Part 9.103).

2. Award Phase

During the award phase, the government chooses which perspective contractor will receive the contract award. Both the government and contractor may participate in contract negotiations, in which terms and conditions are agreed upon to ensure both parties achieve their goals, to include cost, schedule, performance, and any other requirement of the contract.

(4)   Step 4: Source Selection

The source selection process "entails receiving bids or proposals and applying evaluation criteria to select a provider" (Garrett, 2010, p. 137). There are different approaches to handle the source selection process based on the type of procurement. If it is sealed bid procurement, then the bid evaluation is a very structured process. As long as the bid conforms to what is in Section M, then price is the only factor considered. For negotiated contracts, evaluation criteria would have been established in the solicitation planning step. The criterion needs to ensure the greatest potential for successful performance or cost effectiveness for the government. Best value depends upon "sound selection strategies that ensure that the outlined project procurement objectives, including client/user demands are met" (Palaneeswaran, Kumaraswamy, & Ng, 2003). The best value continuum states, "An agency can obtain best value in negotiated acquisitions by using any one or a combination of source selection approaches. In different types of acquisitions, the relative importance of cost or price may vary" (FAR, 2014, Part 15.101). An example of an acquisition where price may not be as important is an item that is well

defined and has relatively low performance risk, like furniture or tires. These items could have cost/price as the deciding factor. An item like a new radar system for an AEGIS-class destroyer requires much more technical development and is far harder to adequately define. In this type of acquisition, factors like past performance and technical performance might be more important than cost. Clearly, the choice of using either the LPTA or Tradeoff strategy plays a role in the government's ability to choose the offeror that presents the "best value." Figure 2 illustrates the relative importance of cost/price factors and non-cost/non-price factors for each source selection strategy.

Source: GAO analysis of Federal Acquisition Regulation Part 15.101. | GAO-14-584
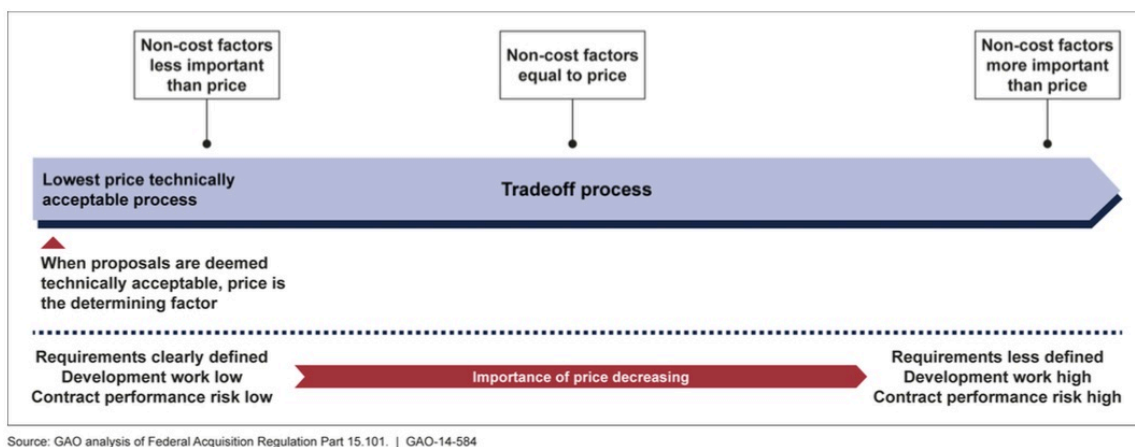
Figure 2.   Best Value Continuum (from GAO, 2010)

In LPTA, an established acceptability standard is set for technical requirements, and that is what all bidders must meet. The contract is awarded to the bidder who meets that standard (a standard considered technically acceptable) and has the lowest price. Tradeoff selections occur when the contracting officer believes that the offer gives the government an advantage somewhere else on the best value continuum that is not strictly based on cost/price, though cost is always a factor.

3. Post-award Phase

The post-award phase includes events that take place once the contract has been awarded through its completion, whether that is by completion or termination. No two contracts are alike in how they are administered once a contract is awarded; contract

administration can be direct and simple or quite complex. The key is in monitoring and evaluating the contractor to ensure that the terms and conditions of the contract are being met. Contract closeout entails taking care of the final details of the contract so it can be closed out.

(5)   Step 5: Contract Administration

The contract administration step begins once the contract is awarded; it is "the process of ensuring that each party's performance meets contractual requirements" (Garrett, 2010, p. 162). Much of the documentation and information developed and determined early in the solicitation planning step, such as the SOW, terms and conditions, and schedule are executed during this step. The contract itself is a crucial piece to guide the effort. Oftentimes changes or modifications are necessary when dealing with government contracts; these take place during the contract administration step. There are two types of modifications listed in the FAR. A bilateral change is something that requires the agreement of both parties and typically includes a change that requires some sort of equitable adjustment (i.e., agreed-upon changes to contract price, schedule, etc.). Unilateral changes only require the contracting officer's approval and are typically used for administrative issues (e.g., changes in accounting lines, payment processes, etc.). The contract administration step is where the contractor is actually doing what the government is paying for, so it is imperative that the contractor's work is monitored to ensure that what was determined in the source selection strategy, whether it was an established acceptable standard or the highest technical performance, is being met. There are several means to monitor the contractor's performance. The government may use quality assurance evaluators (QAE) or contracting officer's technical representatives (COTR) to ensure the contractor is providing materials or services at an acceptable standard. These individuals provide the contracting officer with information to ensure the contractor is meeting the requirements of the SOW and other contractual requirements. Another way to measure the contractor's performance is thru earned value management (EVM). EVM measures a project's cost, schedule and performance progress by comparing the actual figures with planned estimates. Performance is measured by taking the budgeted cost of work performed and comparing it to the actual costs of the work

performed (Rendon & Snider, 2008). Withholding contractor payments can also be used if performance is lacking, but this should not be done unless all other means have been exhausted and not without following all applicable guidelines.

(6)   Step 6: Contract Closeout and Termination

Contract closeout and termination is the final step for any contract and can go in three different ways: successful performance, termination for convenience (T4C), or termination for default (T4D). A successful contract closeout is how the majority of contracts conclude. This occurs when the contractor has completed all assigned tasks and they are accepted by the buyer (Garrett, 2010, p. 185). This means that all items or services on the contract have been received and/or met and the contractor has received final payment. Upon receipt of the contract completion statement, the contracting officer initiates the contract closeout process in accordance with FAR Part 4.804 (Rendon & Snider, 2008, p. 180).

Contracts that are not completed are closed out through termination, either for convenience or for default. T4C happens when the government exercises its unique right to terminate either partially or completely any contract unilaterally. This process must be in writing, and there is no requirement for justification. The contractor is entitled to termination costs associated with the contract, which may include compensation for work done and allowance for profit (FAR, 2014, Part 49.2). T4D occurs when the government exercises its right to terminate a contact either "partially or completely due to the contractor's actual or anticipated failure to perform contractual obligations" (FAR, 2014, Part 49.401). Any contractor who receives a T4D may be liable to the government for any funds received, regardless of work performed, and any excess costs due to procurement. The contractor may also be liable for procurement costs, should the government need to award a contract to a different contractor to complete the required work. A T4D can also affect the contractors past performance evaluation for future contracts. It is during the contract closeout step in which the government conducts an assessment of the contractors performance using the Contract Performance Assessment Reporting System (CPARS) and Past Performance Information Retrieval System (PPIRS) to ensure past performance information is submitted properly and within an appropriate

time (FAR, 2014, Part 42.1501). As previously discussed, the source selection step is where bids or proposals are received based on evaluation criteria, the next section will discuss in more detail the two types of source selection strategies.

C.   SOURCE SELECTION STRATEGY

Source selection strategies consist of LPTA as well as Tradeoff. The following discussion provides additional detail for each of these strategies.

1. Lowest Price Technically Acceptable

Contracting officers use the LPTA source selection strategy when "best value is expected to result from selection of the technically acceptable proposal with the lowest evaluated price" (FAR, 2014, Part 15.101-2). When using LPTA as a source selection strategy, the solicitation determines evaluation factors and significant subfactors that establish the requirements of acceptability. Solicitations specify "the award will be made on the basis of the lowest evaluated price of proposals meeting or exceeding the acceptability standards for non-cost factors" (FAR, 2014, Part 15.101-2). Contracting officers are not allowed to use tradeoffs in LPTA actions. Non-cost/price factors are not used during evaluation for acceptability (FAR, 2014, Part 15.101-2). This means that once the government determines an acceptable minimum standard, it can still look at other factors, but cannot use any of them as a deciding factor for making its decision as to who will receive the contract. Once technical acceptability is established, the only relevant factor is cost/price. LPTA is typically used for contracts that have low performance risk and well-defined requirements (FAR, 2014, Part 15.101).

2. Tradeoff

Contracting officers use the Tradeoff source selection strategy when it is expected that the best value can be received from other than the lowest priced offeror or other than the highest technically rated offeror. According to the FAR any items that may affect the contract award for a Tradeoff, evaluation factors and significant subfactors, must be clearly stated in the solicitation with their relative importance. The solicitation states

whether all evaluation factors other than cost or price, "when combined, are significantly more important than, approximately equal to, or significantly less important than cost or price" (FAR, 2014, Part 15.101). Through this process, the government may choose a proposal that is other than the lowest price. "The perceived benefits of the higher priced proposal shall merit the additional cost, and the rationale for Tradeoffs must be documented" (FAR, 2014, Part 15.101-1). This means that if the source selection team determines that factors other than price will provide a better value to the government, then the contracting officer may use those as the primary factors when awarding the contract. Contracting officers must always remember that they have a responsibility to the tax payers and ensure that the factors provide the best value. In a situation where technical performance is weighted higher than cost/price, an offeror that is the highest technically rated may still lose the contract to a lower priced bid if that offeror is deemed to be economically out of range relative to other closely matched technical offerors. The government, even in a Tradeoff strategy, may award to the lowest price offeror that meets the technical requirements. Even though the source selection strategy is based on a Tradeoff, the contracting officer must still explain why the winning bid won (i.e., provide a rationale for award) if it was higher priced than other bids. This is easily done if the winning contractor is far superior technically and close in price, but if the technical performance is close and the price has a large disparity, this may cause issues, including a protest from a lower bidder. A few key factors to ensure a successful use of a Tradeoff source selection are training team members involved and a clear source selection plan. It is imperative to have a motivated and technically talented team led by a strong leader that understands the objectives of the contract. The team needs a well-published schedule, and must have open dialogue and respect between all team members (Wydler, 2010). The previous discussion covered the specifics of the source selection process and the two source selection strategies, LPTA and Tradeoff; the next section will identify some agency reports on how these source selection policies have been implemented.

D.   INVESTIGATIVE REPORTS

Since 1992, GAO has classified DOD's contract management as a high risk. The challenges DOD faces according to GAO are: an insufficient acquisition workforce, ineffective contracting techniques and approaches, less established procedures for service acquisitions, and operational contract support. Of the areas of concern highlighted by the report, the area most directly related to the source selection process is the contracting techniques and approaches. According to GAO, DOD has struggled with utilizing the most effective contract type and the effective use of competition (GAO, 2015). Consequently, Congress has shown an increased focus on the use of best value processes in the DOD acquisition process. Through Section 845 of the National Defense Authorization Act (NDAA) for fiscal year 2010, Congress mandated the GAO to review the "DOD's use of the best value Tradeoff process, specifically when non-cost factors were more important than price" (National Defense Authorization Act, 2010). The GAO looked at fiscal year 2009 contracts with a minimum dollar value of $25 million due to the Defense Federal Acquisition Regulation Supplement (DFARS) requirement of contracts with a value of $25 million or more in a fiscal year to have a written acquisition plan (DFARS 207.103). The GAO's research looked at (a) how often and for what types of contracts the DOD used the best value Tradeoff process; (b) why and how the DOD used such an approach; and (c) challenges, if any, the DOD faced in using the best value Tradeoff process (GAO, 2010). The GAO found that the DOD used best value processes (LPTA or Tradeoff) in 95% of the competitively awarded contracts it reviewed. Figure 3 shows the different source selection strategies the GAO found in its research and the percentage breakdown between cost and non-cost factors. In 69% of awarded contracts, Tradeoff was the source selection strategy used.
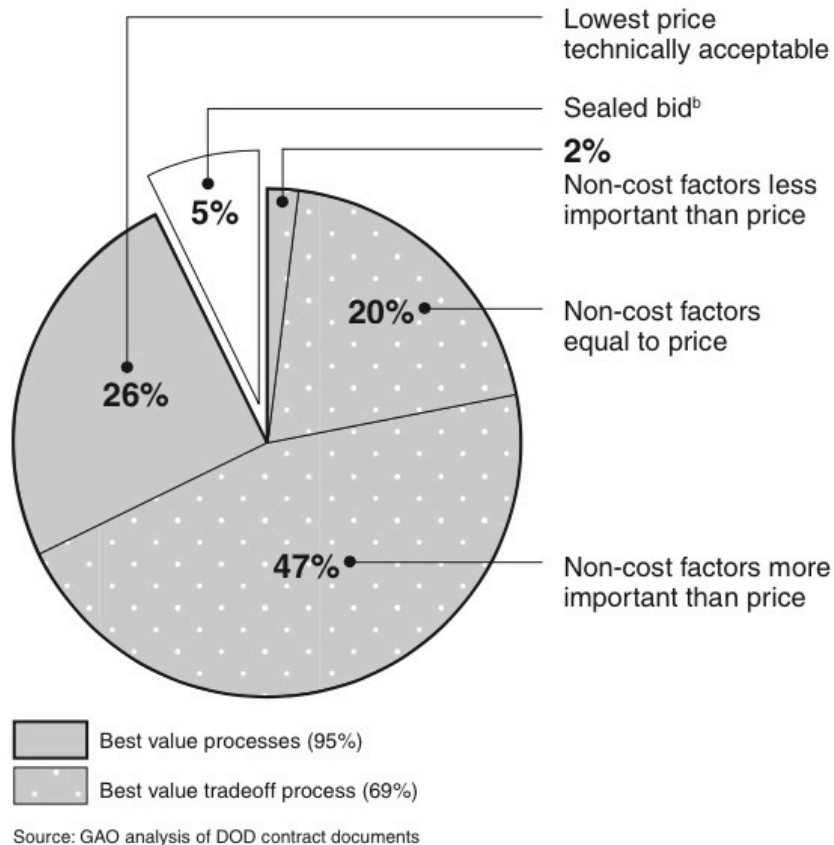
Figure 3.   Selection Strategy Percentages (from GAO, 2010, p. 7)

When the DOD ranked Tradeoff (non-cost factors more important than price), the typical factors were (not necessarily in this order) past performance, technical, small business, experience, and management. The GAO found that in Tradeoff source selections, the DOD selected a lower priced proposal almost as often as it selected the non-lowest cost proposal. In the situations in which the DOD chose an offer without the lowest cost, on average, the cost differential was less than 5 percent. There were situations where the cost differential was much higher, as in the Marine Corps paying 48% more than the next lower bidder for burn-resistant clothing for soldiers in Iraq. In that situation, the benefit of greater second- and third-degree burn protection outweighed the next offeror's proposal (GAO, 2010, p. 15). The DOD did state that when using Tradeoff as a source selection strategy, there were certain challenges that may arise that were not as prevalent in the LPTA strategy, such as difficulties in developing meaningful evaluation factors, additional time investment, and the level of business judgment

required. Instances arose where contracting personnel awarded a contract based on Tradeoff procedures, but failed to adequately evaluate the factors. The Naval Facilities Engineering Command (NAVFAC) was investigated by the Department of Defense Inspector General (DODIG) over a contract that in the end revealed the correct prospective contractor won the bid, but there were issues in the technical evaluation and missed past performance factors (DODIG, 2006). The Marine Corps experienced a similar situation where evaluation criteria in solicitations lacked adequate documentation and the disclosure of technical data. (DODIG, 2009). These difficulties are exasperated by the knowledge that many seasoned and experienced acquisition professionals are retiring and the DOD expects to increase its contracting career field by 6,400 personnel by fiscal year 2015 (GAO, 2010, p. 18).

The GAO concluded that in fiscal year 2009, best value Tradeoff accounted for the majority of competitive contract awards, and using the process effectively depends on making sound Tradeoffs between price and non-cost factors. It recommended the DOD develop a training plan to help contracting professionals determine when the price differential is warranted in making Tradeoff award decisions. The DOD concurred with this assessment (GAO, 2010, p. 26).

The National Defense Authorization Act of 2014 again mandated that the GAO review the DOD's use of best value contract award processes. This time the GAO looked at contracts with obligations over $1 million, the DOD and military departments' guidance on use of best value, and training provided to acquisition professionals from the Defense Acquisition University (DAU) and military departments. The GAO found that, again, Tradeoff was used in the majority of contracts. LPTA was used most often for higher dollar obligations to acquire commercial products and for lower dollar obligations to acquire both products and services. From 2009 to 2013, the use of LPTA increased by 9% in contracts over $25 million (GAO, 2014, p. 10). Figure 4 shows the changes between the two GAO reports. The DOD's increased ability to appropriately define its requirements and its knowledge of potential contractors, through market research, were key factors in determining when to use Tradeoff or LPTA.

Table 1.   GAO Analysis of DOD Solicitation Documents
(from GAO, 2014, p. 12)

Source selection process	Fiscal year 2009 percent	Fiscal year 2013 percent	Statistically significant change[a]
Tradeoff	69	58	Yes
Lowest price technically acceptable	26	36	Yes
Sealed bid	5	6	No

Source: 2009: GAO-11-8; 2013: GAO analysis of DOD solicitation documents. | GAO-14-584

Declining budgets also increased the use of LPTA source selection strategy (GAO, 2014, p. 12). The GAO found that the DAU and military departments provide classroom and online training related to source selection, though it is stressed by both that on-the-job training is key for acquisition personnel to make informed source selection decisions. Defense Procurement and Acquisition Policy officials are also working on updating the DOD's source selection procedures to further define how to conduct best value source selections (GAO, 2014, p. 16).

Though the two GAO reports showed that Tradeoff is chosen significantly more than LPTA, there are many in the defense industry who see the LPTA strategy as the DOD attempting to meet their requirements in the least expensive manner, and, as a result, the warfighter suffers. Ed Spitler, president of Astrium Services Government Inc., a part of the Airbus Group, said "the U.S. military's 'lowest price, technically acceptable' procurement strategy is stifling innovation and ultimately shortchanging war fighters" (Magnuson, 2014). He also said, "You may have written the best proposal of your life ... but it will never be read by the government because of that LPTA requirement. It's a shame because there is no room for innovation when you do that." Mr. Spitler says he has asked procurement officials how they can give contracts to such small, inexperienced firms, and their attitude is: "If they fail or default in year one, we just recompete it" (Magnuson, 2014). In another article, Bob Lohfeld of the Lohfeld Consulting Group explained how in an LPTA contract award; factors other than price cannot be used in the evaluation if the product is deemed technically acceptable. This means that when applying LPTA criteria to past performance evaluations, an "offeror without a record of

relevant past performance or for whom information on past performance is not available or is so sparse that no meaningful past performance rating can be reasonably assigned; the offeror may not be evaluated favorably or unfavorably on past performance" (FAR, 2014, Part 15.305). Therefore, the offeror shall be determined to have unknown past performance. In the context of acceptability/unacceptability, unknown shall be considered acceptable (Lohfeld, 2012).

John Coombs, former Assistant Secretary of the Army for Acquisition, Logistics and Technology, wrote that the way to get LPTA right is by raising the bar for technical acceptability. He wrote that in an LPTA awarded contract, prospective contractors receive nothing for having more qualified personnel. If all have met the technically acceptable standard, those personnel will cost more and mean someone else may have the lowest price. By setting the technically acceptable skill level in the requirement, that becomes the minimum skill required for the contractor (Coombs, 2013). This can help achieve a technical acceptance that is based more on the non-cost/non-price factors than just the price of the bids received.

Jacques S. Gansler, former undersecretary of defense for acquisition, technology, and logistics, and William Lucyshyn, researched the DOD's use of LPTA as a source selection strategy. They found it was imperative for government acquisition professionals to leverage LPTA effectively and appropriately to find cost savings with anticipated declining budgets. They warned that LPTA overuse could have drawbacks; lack of innovation by contractors, impact on quality, and lowered investment on human capital. Gansler and Lucyshyn also provided some recommendations on ways to improve the use of LPTA source selection, without stifling innovation and risking project completion. Only use LPTA when "technically acceptable" can be fully defined and the risk is low. Past performance should be used as an evaluation factor in the LPTA process, especially when acquiring complex mission support services. LPTA should be used when items can be clearly defined, but the risk of over using LPTA to save money could have effects on what the warfighter receives in quality, reduced industry innovation, and reduced schedule and delivery accuracy. The quality of government and prospective contractor communications needs to be improved. Unequal communications, or the lack of

communications, can lead to bid protests and misunderstandings of the government's needs. The last recommendation the two make is for the government to invest in the acquisition work force. In situations where LPTA use was criticized, it is sometimes unclear whether the LPTA source selection strategy itself was to blame, or if the problem rests with the government's inability to sufficiently identify and articulate the minimum requirements. Source selection requires a highly trained workforce to determine if LPTA is the appropriate strategy (Gansler & Lucyshyn, 2013).

E.   SUMMARY

This chapter presented an overview of the contract management process and the associated literature. The chapter began with the basics of contract management and also showed statues and regulations associated with it. We then discussed the three phases of contract management as well as the six steps of the contract management process, highlighting how each had an effect on the source selection strategy. We then focused on the two source selection strategies and their differences. The next chapter provides a discussion of the major Navy acquisition commands, NAVAIR and NAVSEA, and why they were chosen for this research.

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III. NAVAL SYSTEMS COMMANDS

This chapter provides an overview of the DOD and Navy acquisition organizations and the two major Naval Systems Commands: NAVAIR and NAVSEA. The research provides information on the commands' organization, missions, and contracting departments.

A. DOD ACQUISITION ORGANIZATION

The Under Secretary of Defense for Acquisition, Technology, and Logistics (USD [AT&L]) is the principal staff assistant (PSA) to the Secretary and Deputy of Defense for all matters relating to the DOD acquisition system (USD [AT&L], 2014). A primary function of USD (AT&L) is to produce the DOD directive 5000.01. DOD directive 5000.01 is the principle directive on defense acquisition and provides policy and guidance for all DOD acquisition programs. The primary mission of Defense Acquisition is to produce quality and cost efficient products that satisfy user needs to accomplish the mission. There are five major policy objectives of Defense acquisition: promotion of competition; realistic cost projections; affordability, the reality of fiscal constrains; knowledge-based acquisition to include the reduction of manufacturing risk and demonstration of producibility; and application of a systems engineering process (Acquisition Community Connection, 2014). Figure 4 demonstrates that the DOD acquisition organization is a multi-tier management structure. Below the USD (AT&L) are the service acquisition executives (SAE), who oversee the program executive offices (PEO). PEO consists of the program management offices, which are headed by program managers (PM) and include other members of the acquisition team. The Navy's Acquisition Organization will be discussed next.
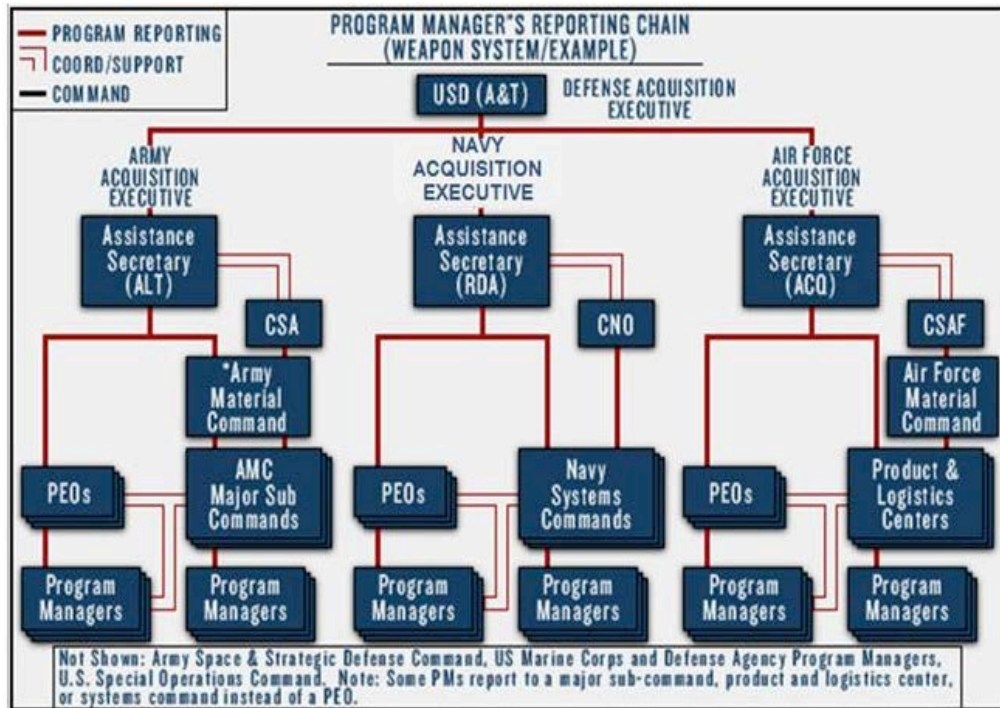
Figure 4.   USD (AT&L) Acquisition Community Connection (from
Acquisition Community Connection, 2014)

B. NAVY ACQUISITION ORGANIZATION

The Assistant Secretary of the Navy (ASN) for research, development and acquisition (RDA) manages the Navy acquisition organization. ASN (RDA) is responsible for: representation before AT&L and Congress regarding policies and programs; development of Marine Corps and Navy weapons systems; and acquisition for entire functions and programs. Different layers within the Navy's organization taskforce execute its mission: ASN; PEOs; direct reporting program managers (DRPMs); the naval systems commands; and their field activities. Each layer carries out its own responsibilities. For example, PEOs and DRPMs oversee specific programs/program managers and receive matrix support from different systems commands (SYSCOMs) such as Naval Sea Systems, Naval Air Systems, and Naval Supply Systems. The SYSCOMs primarily support NAVY with material and they report to ASN (Acquisition Community Connection, 2014).

Figure 5 shows the Navy organizational chart for research, development, and acquisition.

Figure 5.   Navy Organization Chart for Research, Development, and Acquisition (from ASN [RDA], 2014)

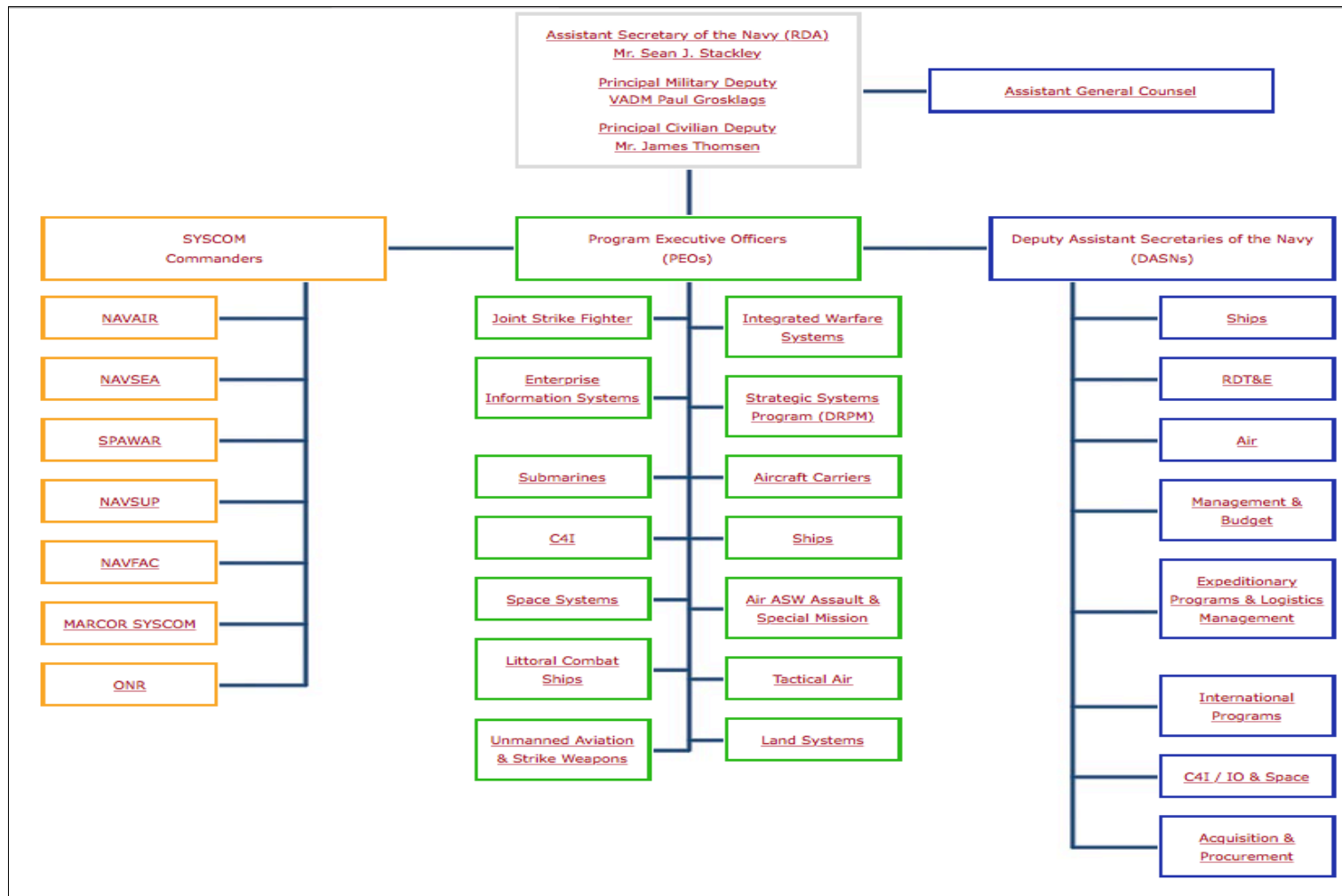## C. DEPUTY ASSISTANT SECRETARIES OF THE NAVY ACQUISITION AND PROCUREMENT

As shown in Figure 5, SYSCOM commanders such as NAVAIR and NAVSEA fall under ASN (RDA); similarly, Deputy Assistant Secretaries of the Navy (Acquisition and Procurement) (DASN [AP]) falls under ASN (RDA). DASN (AP) provides policy and procedures for the Navy's world-wide acquisition system. As stated on the website, DASN (AP)'s mission is "to shape acquisition and logistics policies that assure sailors and marines are mission capable, and have a technological edge over adversaries." DASN (AP) has four primary goals, to advise ASN (RDA), serve as DON Competition Advocate General, establish acquisition and logistics policy, and improve the acquisition systems (DASN AP, 2015).

D. NAVSEA ORGANIZATION

NAVSEA is the DON's primary shipbuilding agency. According to NAVSEA's official website (2014), its mission is to "design, build, deliver, and maintain ships and systems on time and on budget." Their organization consists of command staff and affiliated PEOs including: Ships, Littoral Combat Ships, Submarines, Carriers and Integrated Warfare Systems as seen in Figure 6. NAVSEA manages the life-cycle of acquisition programs from planning to retirement. Their staff consists of 60,000 civilians, military and contractors. Compared to other five SYSCOMs, NAVSEA has the highest yearly budget of $30 billion. NAVSEA handles 150 acquisitions programs, and oversees billions of dollars in foreign military sales (NAVSEA, 2014). NAVSEA operates in 16 states with 33 activities and plays a major role in the NAVY Enterprise that is responsible of guiding resource sponsors that regulates technical standards for combat systems (NAVSEA, 2014). NAVSEA's affiliated PEOs are:

- PEO for Ships
- PEO for Littoral Ships
- PEO for Submarines
- PEO for Integrated Warfare Systems
  (NAVSEA, 2014)
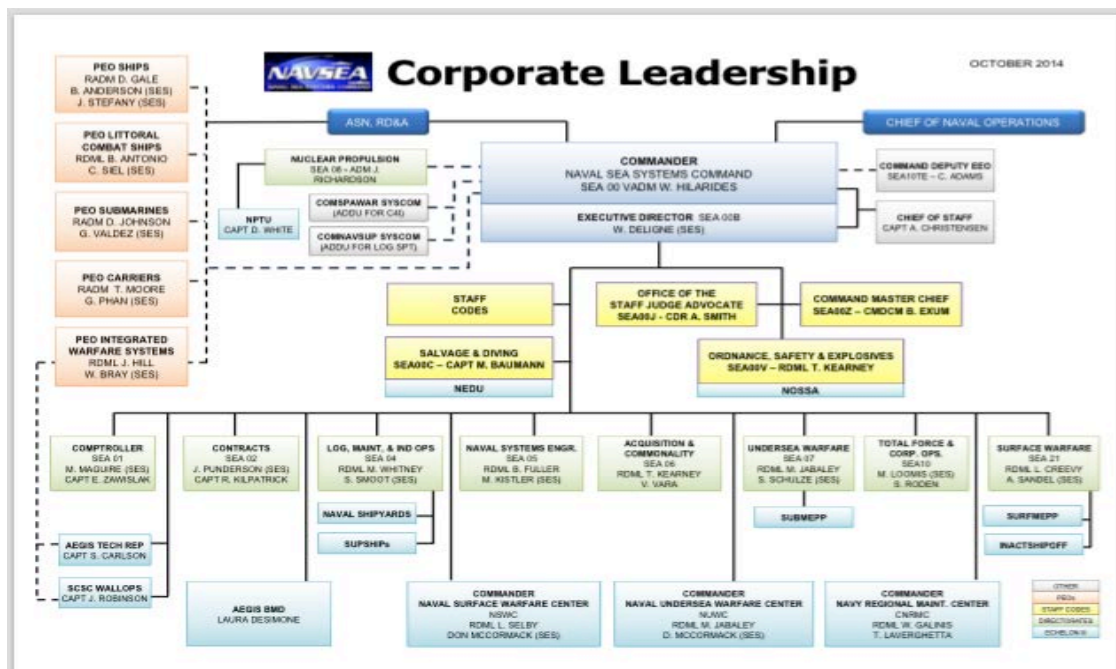
Figure 6.   NAVSEA Corporate Leadership 2014 (from NAVSEA, 2014)

As per NAVSEA, its field activities are located in many different parts of the country in order to assist its numerous customers, such as the fleet and DOD, providing products and support, along with engineering, scientific, technical, and logistical expertise. As Figure 7 illustrates, the headquarters of NAVSEA is located in the Washington, DC, Navy Yard. NAVSEA's four shipyards include Norfolk Naval Shipyard in Portsmouth, Virginia; Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility (IMF) in Pearl Harbor, Hawaii; the Portsmouth Naval Shipyard in Kittery, Maine; and Puget Sound Naval Shipyard and IMF in Bremerton, Washington. NAVSEA has two warfare centers: the Naval Surface Warfare Center (NSWC) and the Naval Undersea Warfare Center (NUWC). The warfare centers play an important role in supplying various support and services to satisfy customer requirements. The support and services include technical operations, people, technology, engineering, and products. They are considered key players in analyzing and assessing the various ship and submarine systems. These include combat systems, ordnance, mines, and strategic systems products and support (NAVSEA, 2014). Figure 7 illustrates the NAVSEA field activities.
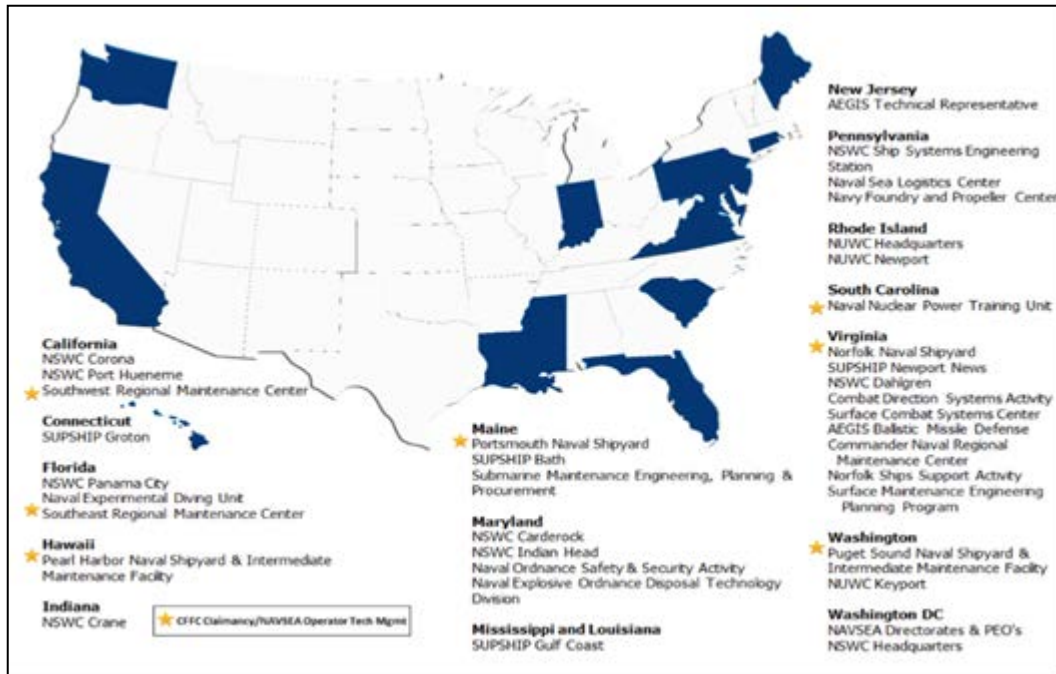
Figure 7.   NAVSEA Field Activities (from NAVSEA, 2014)

SEA 02, the contracting office for NAVSEA, processes almost $24 billion in contracts every year. SEA 02 typically awards contracts for new procurement for construction; repair of ships and submarines; major weapon systems and other types of maintenance. The procurement process includes developing and planning acquisition strategies. SEA 02 uses different procurement methods to fulfill the warfighters needs such as: solicitation, negotiation and award of contracts; as well as administration of contract performance (NAVSEA, 2014).

NAVSEA states that SEA 02 has contracts for the following requirements:

- Ships, shipboard weapons, and combat systems
- Design and integration
- Maintenance and repair
- Modernization and conversion
- Technical, industrial and logistics supports
- Other professional services, such as engineering, finance, and program management
  (NAVSEA, 2014)

As shown in Figure 8, SEA 02 has five divisions. First, SEA 022 is the shipbuilding division that deals with four types of contracts such as Cost-Plus Fixed Fee (CPFF), Cost-Plus Award Fee (CPAF), and Cost-Plus Incentive Fee (CPIF) contract types. Second, SEA 024 is the ship repair division that primarily uses CPFF contracts. Third, SEA 025 is the surface systems division that primarily uses Firm Fixed Priced (FFP) types of contracts such as Fixed-Plus Incentive Fee (FPIF). Fourth, SEA 026 is the submarine systems division that procures hardware and uses FFP and FPIF contracts (Graham, Lewis, & Wallace, 2010).
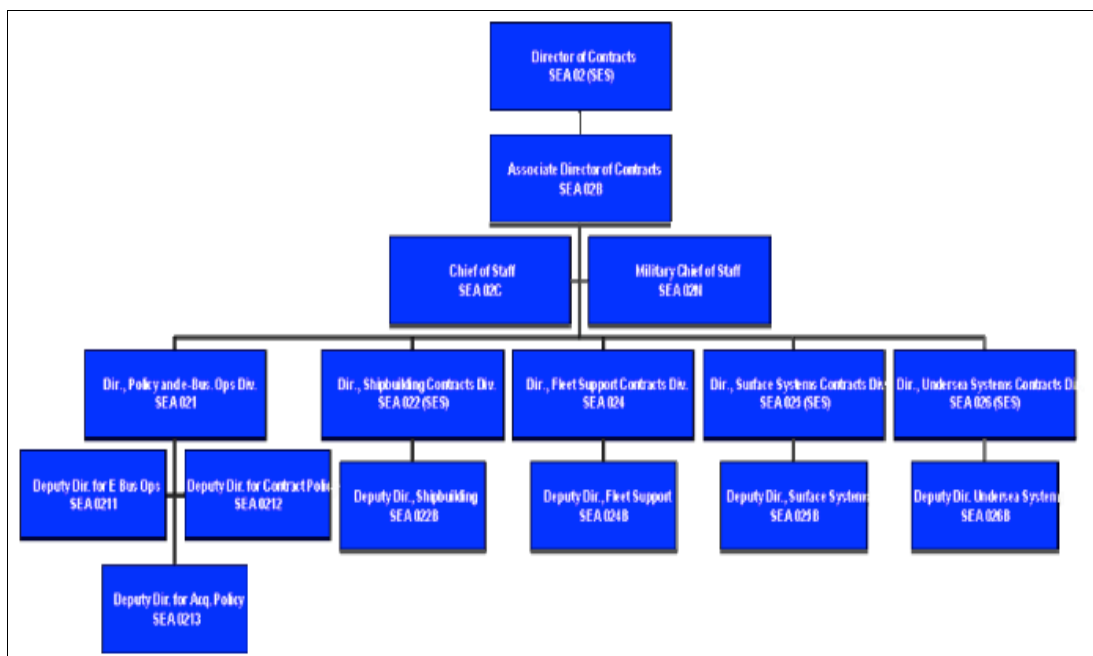
Figure 8.   Organizational Chart of Contract Sea 02 (from Graham et al., 2010)

E.   NAVAIR ORGANIZATION

Headquartered in Patuxent River, Maryland, NAVAIR was established in 1966 and is the primary agency responsible for the development and procurement of Navy and Marine Corps aviation assets (NAVAIR, 2014). According to the website, NAVAIR's mission is "to provide full life-cycle support of naval aircraft, weapons, and systems operated by sailors and marines" into eight functional areas, they are: "research, design, development and systems engineering; acquisition; test and evaluation; training facilities

and equipment; repair and modification; in-service engineering and logistics support"
(NAVAIR, 2014).

Structurally, NAVAIR is also organized into eight communities of practice (CoP)
such as: "program management, contracts, research and engineering, test and evaluation,
logistics and industrial operations, corporate operations, comptroller and counsel"
(NAVAIR, 2014). The primary recipients of NAVAIR's support are the Program
Executive Officers (PEOS) and the program managers (PMs) who manage the acquisition
"program's cost, schedule, and performance requirements." Typically this support takes
the form of a combination of the following: "people, processes, tools, training, mission
facilities, and core technologies" (NAVAIR, 2014).

As per NAVAIR, there are four affiliated PEOs are:

- PEO for Tactical Aircraft Programs: PEO (T)
- PEO for Air Anti Surface Warfare (ASW), Assault and Special Mission
  Programs: PEO (A)
- PEO for Unmanned Aviation and Strike Weapons: PEO (U&W)
- PEO for Joint Strike Fighter: PEO (JSF; which alternates service lead with
  the Air Force)
  (NAVAIR 2014)

As shown in Figure 9, NAVAIR has eight core competencies: Program
Management (AIR 1.0), Contracts (AIR 2.0), Research & Engineering (AIR 4.0), Test &
Evaluation (AIR 5.0), Logistics & Industrial Operations (AIR 6.0), Corporate Operations
(AIR 7.0), and the Comptroller (AIR 10.0) (NAVAIR, 2014).
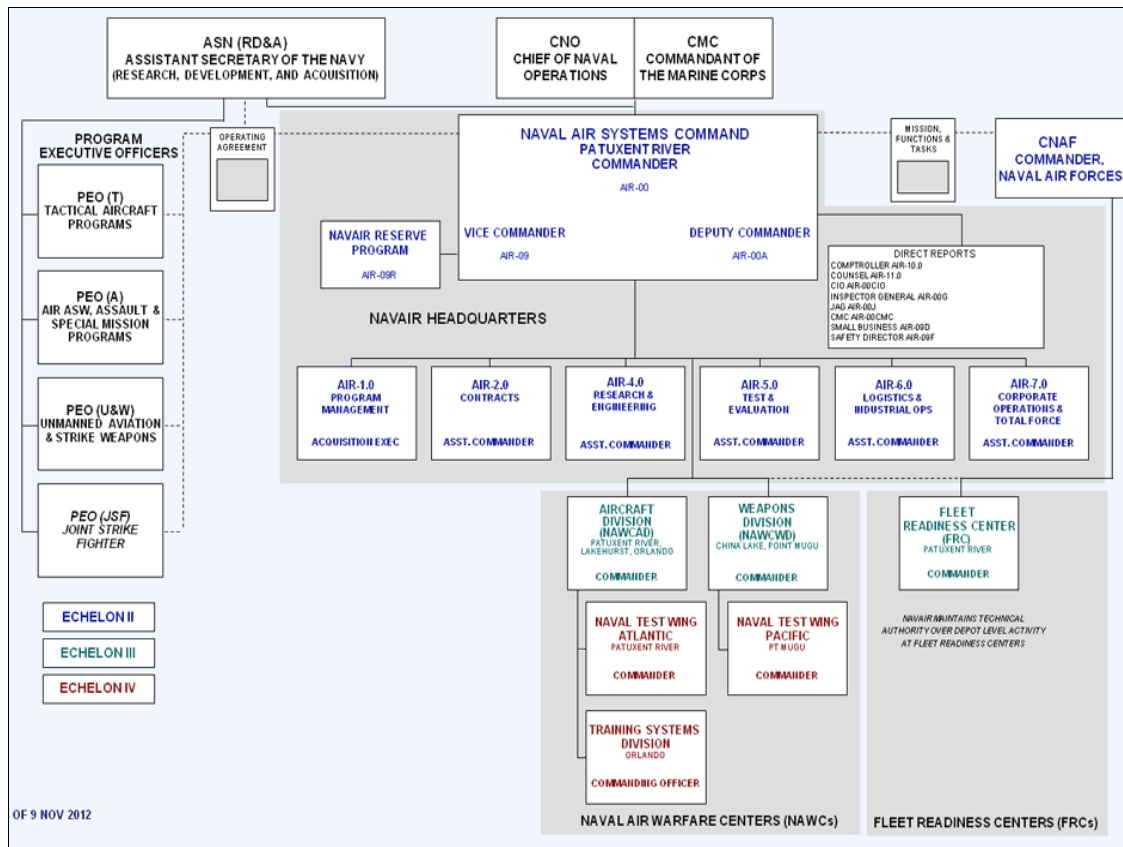
Figure 9.   NAVAIR Organization Chart (from NAVAIR, 2014)

Figure 10 shows NAVAIR's major sites. China Lake and Point Mugu comprise the weapons division. Lakehurst, Cherry Point, and Patuxent River comprise the aircraft division. Finally, Jacksonville and North Island are the depot/industrial sites.
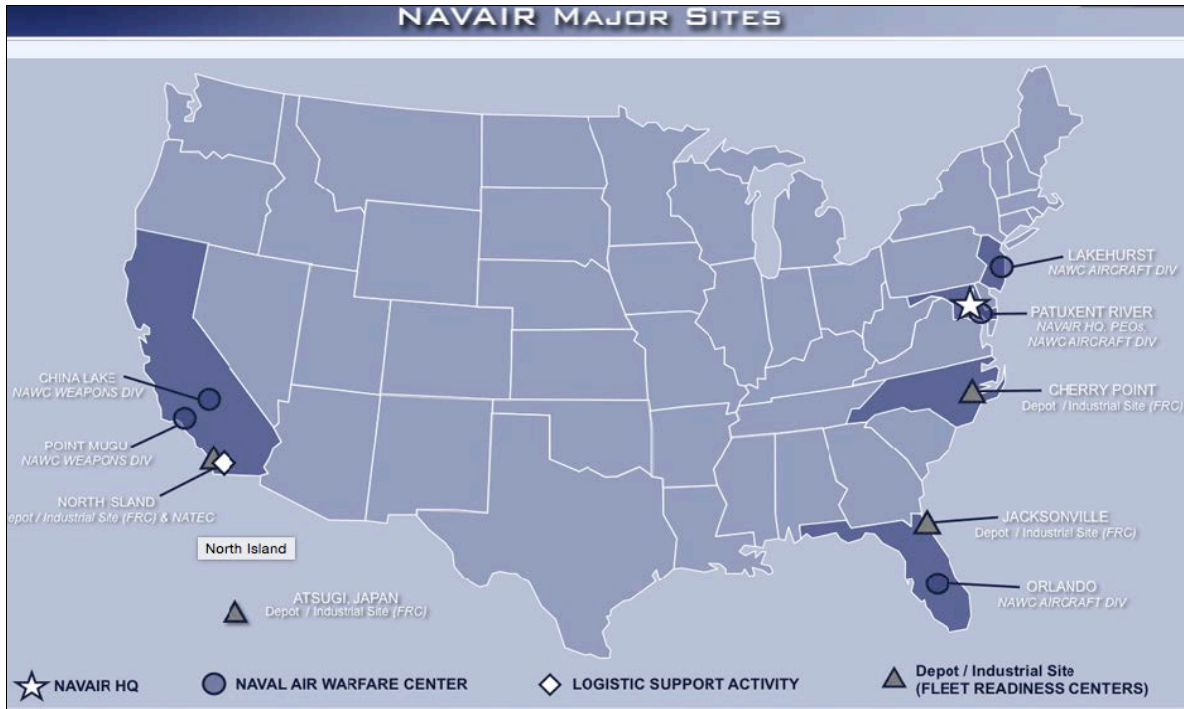
Figure 10.   NAVAIR Major Sites (from NAVAIR, 2014)

NAVAIR 2.0 is "accountable for contracting supplies, services, and material requirements of Integrated Program Teams (IPT), Program Support Teams (PST), and Enterprise Teams" (ET; NAVAIR, 2014). As shown in Figure 11, NAVAIR 2.0 has six departments (AIR 2.1, AIR 2.2, AIR 2.3, AIR 2.4, AIR 2.5, and AIR 2.6).
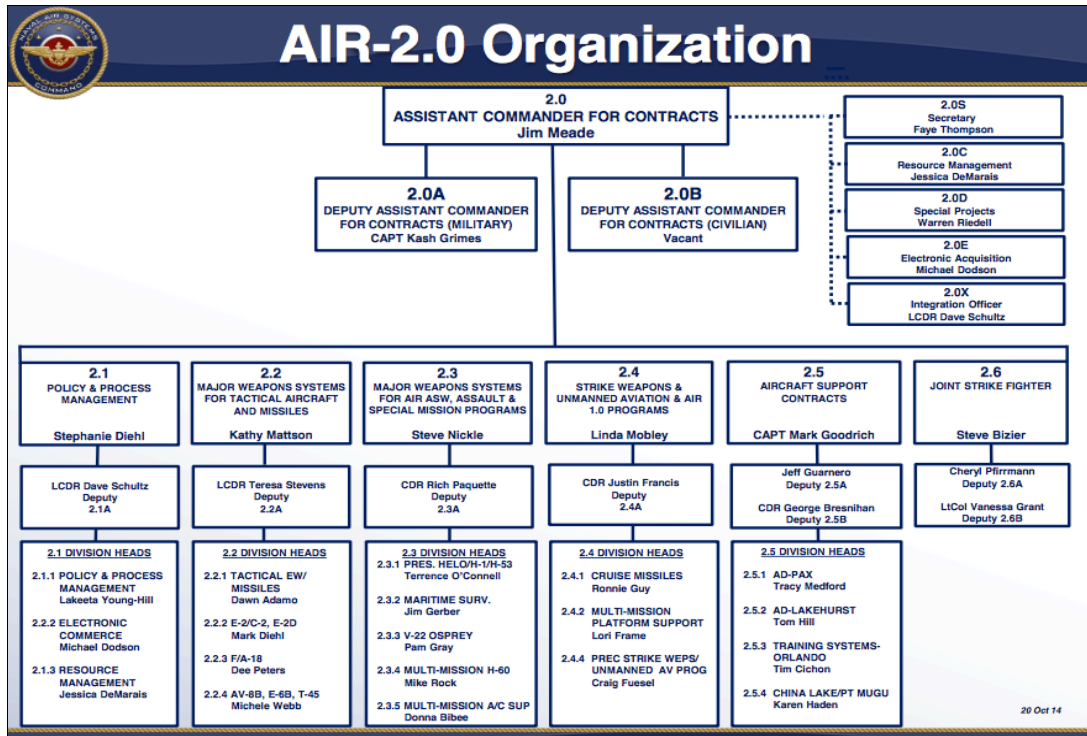
Figure 11.   NAVAIR 2.0 Organization Chart (from NAVAIR, 2014)

F.   WHY NAVAIR AND NAVSEA FOR THIS RESEARCH?

NAVAIR and NAVSEA, two major SYSCOMs, were chosen for this research project because they have the largest procurement organizations in the Navy that procure not only simple goods and services but also complex systems. These two commands conduct multiple contracting source selections, which consist of sufficient mixture of LPTA and the Tradeoff source selection strategies to answer our research questions.

G.   SUMMARY

This chapter provided an overview of the DOD acquisition organization and primarily focused on the Navy's organization of acquisition activities. The chapter also included a discussion of the two major systems commands, NAVAIR and NAVSEA specifically their organization, mission, and contracting divisions. The next chapter discusses how data was accessed, the statistical analysis of that data, the findings of the analysis, implication and results, and areas for further research.

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IV. ANALYSIS

In this chapter, we discuss the research methodology and analysis conducted to answer the research questions presented in Chapter I. Specifically, we discuss the source of the data, the data collection method, and how the data were analyzed. We also include a description of the spreadsheet we used and the type of data collected.

A. OVERVIEW OF THE DATA

The purpose of this research is to explore potential relationship between the source selection strategy (LPTA or Tradeoff) and resultant contract outcomes; thus NAVAIR and NAVSEA provided us the best option within the Navy to collect data that captures the entire contracting management process. As the Navy's two largest SYSCOMs, NAVAIR and NAVSEA have a combined fiscal year 2015 budget of $53 billion (NAVAIR & NAVSEA, 2014). Given their wide acquisition authority, they are ideal sources of data for our research, namely, completed contracts.

1. Data Source

To collect the data needed, we manually reviewed hard copies of completed contracts at NAVAIR and NAVSEA's contract file repositories. All three members of the research team traveled to NAVAIR and NAVSEA and spent two days reviewing contract files at each location. To capture the data, we used a spreadsheet developed by our advisors, Professors Rene Rendon and Karen Landale. The spreadsheet was designed to capture all the relevant details of a procurement that might affect contract outcomes. To maximize our efficiency, we sent advance copies of our spreadsheet to each command and asked for assistance locating relevant contract files. Both commands were quite accommodating to our request for access to their contract files, and each provided a workstation and a representative to assist us with locating files.

Upon arriving at NAVAIR, our first stop, we were overwhelmed by the volumes of contracts files that lined the shelves. Our initial assessment of each file room was that we would have no trouble collecting a large sample of the contract data. Unfortunately,

individual contract files proved to be much larger and more complex than we had anticipated and far more difficult to mine for the pertinent data fields. While each command employs the use of a contract file checklist that contained the elements of FAR 4.803, we observed that about a third of the contracts we reviewed did not follow it as prescribed. Some contract files seemed to only include the essential documents while others tended to include a lot of extra data resulting in contract files spanning multiple volumes. We found that the condition of file room and contract files at NAVSEA to be quite similar to those at NAVAIR.

2. Data Description

The spreadsheet we used to collect our data was designed to capture information from all six steps of the contract management process. The spreadsheet is divided into five overarching categories that seek to provide a comprehensive overview of each contract: (1) basic contract information, (2) acquisition complexity, (3) environmental factors, (4) outcomes variables and (5) other relevant contract information. The basic information section captures identifying features of the contract such as contract number, North American Industry Classification System (NAICS) code, and Product or Service Code (PSC). The acquisition complexity section captures data from both the solicitation and award phases. Some of the high points of this section include contract type, whether the contract is a small business set aside, the dollar value of the requirement, award fee criteria and incentives (as applicable). The environmental factors section addresses the evaluation phase and focuses primarily on the actions of the source selection team. The outcome variables address some pre-award and post-award factors (e.g., they include the number of solicitation amendments, PALT and performance rating data). Finally, the other relevant contract section addresses contracting officer communiqué (e.g., evaluation notices, clarification request and award notices). For a more in-depth look at the spreadsheet, please refer to the appendix.

B.   DATA ANALYSIS

In this section, we describe our data, provide insight into our dataset, and discuss the methodology used to analyze the data.

1. Data Description

For this analysis, we have two dependent, or outcome, variables (DVs): procurement administrative lead-time (PALT) and Contractor Performance Assessment Rating System (CPARS) data. PALT assesses "time to contract" by calculating the number of days between receipt of the requisition and contract award. It is a continuous variable. CPARS serves as a proxy measure of contract success or failure by using the ratings given to each contract once complete. CPARS ratings are given in Likert-style responses where 1=Unsatisfactory, 2=Marginal, 3=Satisfactory, 4=Very Good, and 5=Excellent. In this case, we calculated the overall CPARS score by averaging the following CPARS factors: quality, schedule, management of key personnel, and small business use. While it is preferable to use each CPARS rating as an individual aspect of contract success (i.e., allow each CPARS rating to be a measurable contract outcome), our sample size was not large enough, nor were our cases complete enough, to perform such analyses. Hence, the average score was used.

We have one independent variable, or IV. Independent variables are those that can be manipulated by the researcher (or user) and evoke a change in the outcome, or DV. Our IV concerns the contract methodology used for the contract: LPTA or Tradeoff. Contracting source selection strategy is a choice made by the "user" (the integrated product team, which includes the Contracting Officer), hence it is considered an IV. Our IV is labeled LPTATO and it is a binary variable where 0=LPTA and 1=Tradeoff.

Finally, we have one covariate variable. Covariates are secondary variables that can also affect the relationship of primary interest: the relationship between the IV and the DV. In particular, covariates are variables *other than* the IV that may substantially affect the DV. Our covariate is contract dollar value (VALUE) and it is a continuous variable. The dollar value of a contract affects the number of reviews it has to go through,

thus affecting the PALT. Higher dollar contracts typically have a more robust review process, and thus longer PALTs. The opposite is typically true for lower dollar value contracts. In this case, we hope to parcel out the effect of the covariate VALUE in order to more clearly see the effect the contracting methodology (LPTATO) has on the outcome variables (PALT and CPARS).

3. Descriptive Statistics

Basic descriptive statistics for each variable are shown in Table 2.[2] The table presents three figures for each variable: (1) the total for all the data, (2) the total for LPTA contracts and (3) the total for Tradeoff contracts.

Table 2.   Data Breakdown

Descriptive Statistics					
Variable	Obs	Mean	SD	Min	Max
PALT (days)	**36**	**398.17**	**265.80**	**3**	**953**
	6	170.67	225.96	3	623
	30	*443.67*	*252.21*	*112*	*953*
CPARS (rating)	**20**	**4.04**	**.97**	**2**	**5**
	2	3.13	.18	3	3.25
	18	*4.14*	*.97*	*2*	*5*
VALUE (dollars)	**38**	**$65,300,000**	**$105,000,000**	**$238,410**	**$450,000,000**
	7	$67,200,000	$169,000,000	$238,410	$450,000,000
	31	*$64,800,000*	*$88,800,000*	*$1,199,776*	*$353,000,000*

*Bold=total for all data, non-italicized=LPTA, italicized=Tradeoff

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[2] One outlying observation was deleted from the dataset. Analyses were performed both before and after deletion. The outlying observation did not affect overall significance of the results, however because the graphics were clearer without the observation, it was removed. All results presented in this paper exclude the outlying observation.

4. Data Issues

With 36 cases, our sample size is somewhat small. Power calculations suggest the need for 14 cases of each contracting source selection strategy (i.e., 14 LPTA cases and 14 Tradeoff cases) in order to achieve adequate power ($\alpha = .05$, $\beta = .80$). Our data is unbalanced with respect to the number of cases for each contracting source selection strategy. There are 6 LPTA cases and 30 Tradeoff cases. This unbalanced design can cause ambiguity about the mean as the intercept and make assignment of sums of squares more difficult. There are, however, solutions to these issues. A weighted mean can be used in place of the grand mean[3] and the STATA software automatically handles the assignment of the sums of squares. Thus, we proceeded with our analysis despite these issues.

5. Analysis

Because our intent is to analyze differences in contract outcomes (PALT and CPARS) based on contracting methodology (LPTA or Tradeoff), a group comparison statistical methodology is necessary. In other words, the contracting source selection strategies are divided into two groups (LPTA and Tradeoff), and we seek to find if there are differences in contract outcomes (PALT and CPARS) by group.

We initially used a technique called multivariate analysis of covariance, or MANCOVA, to assess group differences. The results showed that there were no differences in contract outcomes based on the contracting methodology used. Regardless of whether the acquisition team chose a LPTA or Tradeoff source selection strategy, the lead-time required to put the requirement on contract (PALT) and the success of the contract (as measured by CPARS ratings) did not vary (i.e., were not significantly different). We suspected that the results may be different if we examined just one contract outcome at a time, thus post-hoc analyses were performed in which PALT and CPARS were analyzed separately. Because we were now assessing the outcome variables

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[3] The grand mean would be the intercept in a balanced design.

individually, the methodology changed from a *multivariate* test (MANCOVA) to a *univariate* test, known simply as analysis of covariance, or ANCOVA.

ANCOVA addresses the following questions:

- Are mean differences among the groups (after adjusting for covariate effects) likely to have occurred by chance?
- Taken from another angle, is there a significant difference between the mean value for PALT in the LPTA acquisitions versus the mean value for PALT in the Tradeoff acquisitions once the effect of the covariate (VALUE) has been parceled out?

ANCOVA examines the relationships between the dependent variables (PALT and CPARS) and the independent variable (choice of LPTA or Tradeoff strategy) while taking into account the effect the covariate (VALUE) might have on the outcome variables (PALT and CPARS).

6. Assumption Testing

Before conducting the ANCOVA, certain assumptions about the data were tested. First, we assessed univariate normality by performing the Shapiro-Wilk test. Both PALT and contract value (VALUE) were deemed to be non-normal. PALT was normalized via a square root transformation, while a logarithmic transformation was performed on VALUE. Both variables passed the Shapiro-Wilk normality test once transformed.

Second, we assessed linearity by examining scatter plots of the dependent variables (PALT and CPARS) and the covariate variable (VALUE). The plots revealed fairly linear relationships between the variables.

Third, we assessed homogeneity of regression by performing an analysis of variance (ANOVA, which is practically the same as an ANCOVA but does not contain a covariate variable) that included the independent variable (LPTA or Tradeoff), the covariate VALUE, and the interaction between the independent variable and the covariate. The interaction term was not significant, which indicates that the relationship between the dependent variables (PALT and CPARS) and covariate (VALUE) is the same at both levels of the independent variable (LPTA or Tradeoff). Hence, the assumption of homogeneity of regression is upheld.

Finally, we checked for homogeneity of variance between groups using Bartlett's Test. The results showed the difference in variance between the groups (LPTA and Tradeoff) are not significant, thus the assumption of homogeneity of variance is upheld.

C. RESULTS

Using CPARS as the dependent variable produced no significant findings. Essentially, we find no significant differences in contract success (as measured by CPARS data) between the two methodologies (LPTA and Tradeoff). Table 3 shows the results of this analysis.

Table 3. ANCOVA Using CPARS as the DV

ANCOVA Using CPARS as the DV					
Source	Partial SS^	df	MS^^	F	Prob > F
Model	3.66	2	1.83	2.18	.1433 ns
VALUE	1.81	1	1.81	2.16	.1601 ns
LPTATO	1.77	1	1.77	2.11	.1650 ns
Residual	14.25	17	.84		
Total	17.91	19	.94		
^ Partial sum of squares ^^ Mean square Number of Observations = 20 Root Mean Squared Error = .92 R^2 = .2043 Adjusted R^2 = .1107					

Using PALT as the dependent variable, however, showed significant differences exist in the lead-time for acquisitions that use LPTA versus acquisitions that use Tradeoff, even when contract dollar value is taken into account. Specifically, LPTA acquisitions are much shorter than Tradeoff acquisitions (Mean LPTA = 170.67 days, Mean Tradeoff = 443.67 days). Table 4 provides the results in summary format.

Table 4.   ANCOVA Using PALT as the DV

ANCOVA Using PALT as the DV					
Source	Partial SS^	df	MS^^	F	Prob > F
Model	435.24	2	217.62	5.57	.0083**
VALUE	12.24	1	12.24	.31	.5795 ns
LPTATO	197.27	1	197.27	5.05	.0315*
Residual	1290.03	33	39.09		
Total	1725.26	35	49.29		

* p<.05 ** p<.01
^ Partial sum of squares ^^ Mean square
Number of Observations = 36
Root Mean Squared Error = 6.25
R^2 = .2523
Adjusted R^2 = .2070

As a final post-hoc analysis, we examined whether there were significant differences in PALT based on the procuring organization (NAVSEA vs. NAVAIR). No significant differences were found.

D.   DISCUSSION

The results of this research should be viewed critically given the limited size and the unbalance nature of the sample. Our findings clearly suggest that PALT is significantly shorter by 227.5 days when contracts are awarded based on an LPTA source selection strategy, empirically lending support to what was previously only an anecdotal belief. This result was found even when contract dollar value was included in the model. In the DOD, the dollar value of the acquisition "trips" certain evaluation and review thresholds. The higher the dollar value, the more thresholds the requirement must pass prior to award, thus increasing lead time. Finding these results with dollar value included in the model lends credence to the notion that LPTA acquisitions are in fact shorter than Tradeoff source acquisitions. Given the dynamic nature of the DOD, shorter acquisition lead-time is typically preferred because it directly translates to delivering the requirement to the warfighter sooner.

E.   SUMMARY

This chapter provided the results of our research. The chapter began with an overview of the data, to include a description of the data sources and a description of the spreadsheet created to gather the data. Next, the data and methodology were described, and the results of the research were presented. The final chapter includes a summary of the research, conclusions and areas for further research.

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V. SUMMARY, CONCLUSION, AND AREAS FOR FURTHER RESEARCH

This chapter provides a summary of the research, provides answers to our research questions, and recommends areas of further research.

A. SUMMARY

The DOD spends billions of dollars annually acquiring weapons systems, supplies and services to support the needs of the warfighters. Government acquisition professionals use the six steps of the contract management process to award the contracts for these good and services. The contract management process consists of pre-award, award, and post award phases. A key step in the contract management process is source selection, which occurs during the award phase. The two primary source selection strategies used to obtain the best value for the government are LPTA and Tradeoff. The purpose of this research is to determine potential relationships between the source selection strategy (LPTA or Tradeoff) and resultant contract outcomes. Data were collected from completed contract files at NAVAIR and NAVSEA, paying particularly attention to the source selection strategies chosen for each contract. The data were then analyzed to determine how the choice of source selection strategy affects contract outcomes.

B. CONCLUSION

To conclude this research, we present answers to the research questions posed in Chapter I.

(1) How does the source selection strategy affect pre-award metrics (e.g., PALT, number of solicitation amendments, number of protests)?

Our analyses proved that significant differences exist in the PALT based on source selection strategy. As illustrated in Figure 12, the PALT mean time for LPTA is 170.67 days versus 443.67 days for Tradeoff. The results of our research lend support to the anecdotal assumption that Tradeoff contracts have a longer lead-time for award.

Given the unbalanced nature of the data collected (30 Tradeoffs and 6 LPTA) it appears that major weapons system acquisition commands seems to favor a Tradeoff source selection strategy, as one would expect given the developmental nature of many weapon systems.
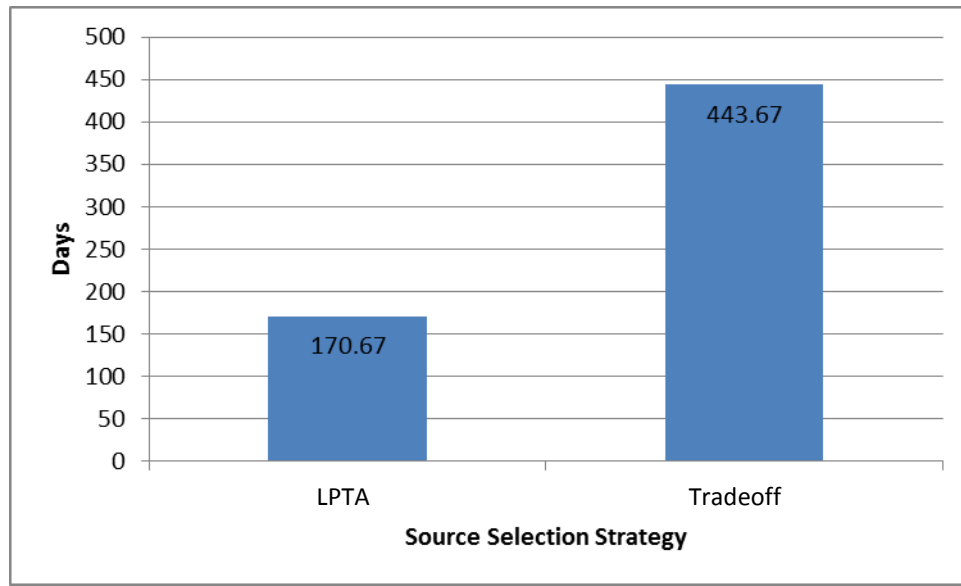

Figure 12.   LPTA versus Tradeoff in Days

The results of the analyses did not yield any significant findings regarding the number of solicitation amendments or the number of protests based on the source selection strategy chosen. It also did not produce any significant findings that would lead to a conclusion that a particular source selection strategy (LPTA or Tradeoff) produces a higher or lower occurrence of amendments or protests. Of the 36 cases evaluated, less than 10% (3 of 36 contracts) received a protest. Each protest was made to the GAO, two were dismissed and one denied. Given these few cases no further analysis was conducted.

(2)   How does the source selection strategy affect post-award outcomes (e.g., Contractor Performance Assessment Reporting Systems [CPARS] ratings, Earned Value Management [EVM] performance metrics)?

Only 55% of the contract data we collected had CPARS ratings. That is not to say that CPARS was not performed on these contracts, but simply that our PPIRs search did

not produce any CPARS data for 45% of the contracts reviewed. In our analysis of the 20 contracts with CPARS data, we found no significant difference in contract outcomes based on source selection strategy (LPTA or Tradeoff). However, given the small size of our sample, the reliability of this finding is not strong. A much larger sample is required to accurately assess differences.

We were unable to collect EVM performance metrics data on any of the contracts in our sample. EVM data was not available in the files we reviewed and our attempts to gain access to Defense Acquisition Management Information Retrieval (DAMIR) failed. Therefore, our research is inconclusive with regard to EVM performance differences based on source selection strategy.

(3)   Does one source selection strategy consistently fare better than the other in terms of both pre-award metrics and post-award outcomes?

The results of our research seem to suggest that an LPTA source selection strategy has a significantly shorter lead-time to contract award. That said, our finding should be viewed with caution as our sample size consisted of only a few LPTA cases (six)—a sample size that is too small and too unbalanced to produce fully reliable results. Also, the data were inconclusive in terms of linking a pre-award metric (i.e., number of solicitation modifications) to contract outcomes.

(4)   Do the contract outcomes (e.g., past performance data) justify the government paying a premium to award to other than the lowest bidder?

More data is needed to answer this question. In particular, more CPARS ratings and EVM performance metrics are required to determine if the premium paid to award a contract to the other than lowest bidder is justified.

C.   AREAS FOR FURTHER RESEARCH

The task of understanding the impact of a source selection strategy on resultant contract outcomes is a topic rich for further research. Our research is valuable in that it highlights the fact that more research is required to better understand the effects of source selection strategy on contract outcomes. Our recommendations for further research are

centered on the areas that proved to be the most difficult for us: collecting a large, well-balance sample size and obtaining performance data (as measured by CPARS and EVM).

(1)   Larger and more balanced sample size

While it is well known that a larger sample size produces more reliable results, it is important to note that collecting data proved to be far more time consuming than anticipated. Choosing to collect data from NAVAIR and NAVSEA had both advantages and disadvantages. The advantage is that as SYSCOMs, they had a large population of complex contracts to choose from. The disadvantage is that because the contracts are typically very large and complex, they took a considerable amount of time to mine for data. Therefore, any researcher attempting to understand this topic must plan accordingly—scrubbing a large, balanced (equal number of LPTA and Tradeoff contracts) sample will require a significant time commitment. Our recommendation is that this process be repeated in its entirety with a greater emphasis on collecting a large and balanced sample.

(2)   Greater access to past performance data (CPARS and EVM)

We had very limited access to CPARS and no access to EVM at all. Therefore, we were unable to produce any reliable findings on the impact of a particular source selection strategy on contract outcomes. Though the results of the ANCOVA analysis described in Chapter IV suggest that there are no differences in outcomes (as measured by CPARS and EVM) between the two source selection strategies (LPTA and Tradeoff), we place little confidence in this finding given the size of our sample. Of the 36 cases, we were only able to collect CPARS data on 20 and zero data on EVM. Further research should be conducted with the focus of evaluating performance (CPARS and EVM) to examine contact outcome. Collecting EVM data will most likely require future researchers to concentrate on major acquisition commands, as they have a higher probability of having contracts that use EVM performance metrics.

APPENDIX. DATA COLLECTION CATEGORIES

Data Collection Catagories					
Basic Info	**Acquisition Complexity**				
Observation #	Predominant Contract Type	# Evaluation Factors	Eval Factor #4	Life Cycle Stage	# Competitive Range	Incentive Fee Criterion #5
Service	SB Set Aside	Eval Factor #1	# Subfactors in EF#4	Joint Urgent Operational Need (JUON)	Single or Multiple Award	Award Fee Criterion #1
Organization	Consolidated Requirement	# Subfactors in EF#1	Eval Factor #5	# CLINs	On-Ramp Provision	Award Fee Criterion #2
Contract Number	Multiyear	Eval Factor #2	# Subfactors in EF#5	Pre-Solicitation Conference/ Industry Day	Incentive Fee Criterion #1	Award Fee Criterion #3
Name	# Years	#Subfactors in EF#2	# Subelements	Pre-Proposal Conference	Incentive Fee Criterion #2	Award Fee Criterion #4
NAICS	Dollar Value	Eval Factor #3	ACAT/SCAT Level	Pre-Award/Pre-Performance Conference	Incentive Fee Criterion #3	Award Fee Criterion #5
PSC	Trade Off or LPTA	# Subfactors in EF#3	FAR Part	# Offerors	Incentive Fee Criterion #4	

Data Collection Catagories						
Environmental Factor		**Outcome Variables**				**Other**
# Reviews	# Team Locations	PALT - Requirement Receipt Date	Protest	EVM CV	RFP Amendment Reason 2	# Evaluation Notices
Review 1 Date	ACE Support	PALT - RFP Issue Date	Protest Level	EVM SV	RFP Amendment Reason 3	# ENs Pre-Competitive Range
Review 2 Date	MIRT Support	PALT - Proposals Received Date	Protest Results	EVM CPI	RFP Amendment Reason 4	# ENs Post-Competitive Range
Review 3 Date	Use of Collaboration Tools	PALT - Contract Award Date	Corrective Action (Describe)	EVM SPI	RFP Amendment Reason 5	# Rounds of ENs
Review 4 Date	Abundance/ Lack of File Documentation Rating	PALT - Days	CPAR Cost	Nunn-McCurdy Breach	RFP Amendment Reason 6	# Clarification Requests
# Personnel on Source Selection Team	State of the Economy	Early Strategy and Issues Session (ESIS) Date (>$100M)	CPAR Quality	# of RFP Amendments	Earned Award Fee %	# Deficiency Reports
		ASP Date	CPAR Business Relationship	RFP Amendment Reason 1	Earned Incentive Amount/ Available	Basis for Award

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